Alteration of channel and ecosystem dynamics downstream of Elwha dams

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Reduced sediment supply to the lower Elwha River since construction of the first Elwha dam in 1912 has caused modest river entrenchment and decreased channel movement. To understand how these changes alter the spatial and temporal dynamics of the river-floodplain ecosystem, we combine data for erosion and formation of floodplain surfaces, successional patterns of floodplain vegetation, and responses of riverine fauna to the shifting suite of habitat types. We first develop a matrix of transition probabilities that describes the spatial and temporal dynamics of habitat patches in the river-floodplain system. Field surveys of morphological and biotic attributes of different patch types are then used to infer spatial and temporal variations in aquatic communities based on the transition matrix, and to predict how the floodplain ecosystem will respond to dam removal.